



# ENERGY STAR®: Why Rate Whole Building Energy Performance

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# ENERGY STAR

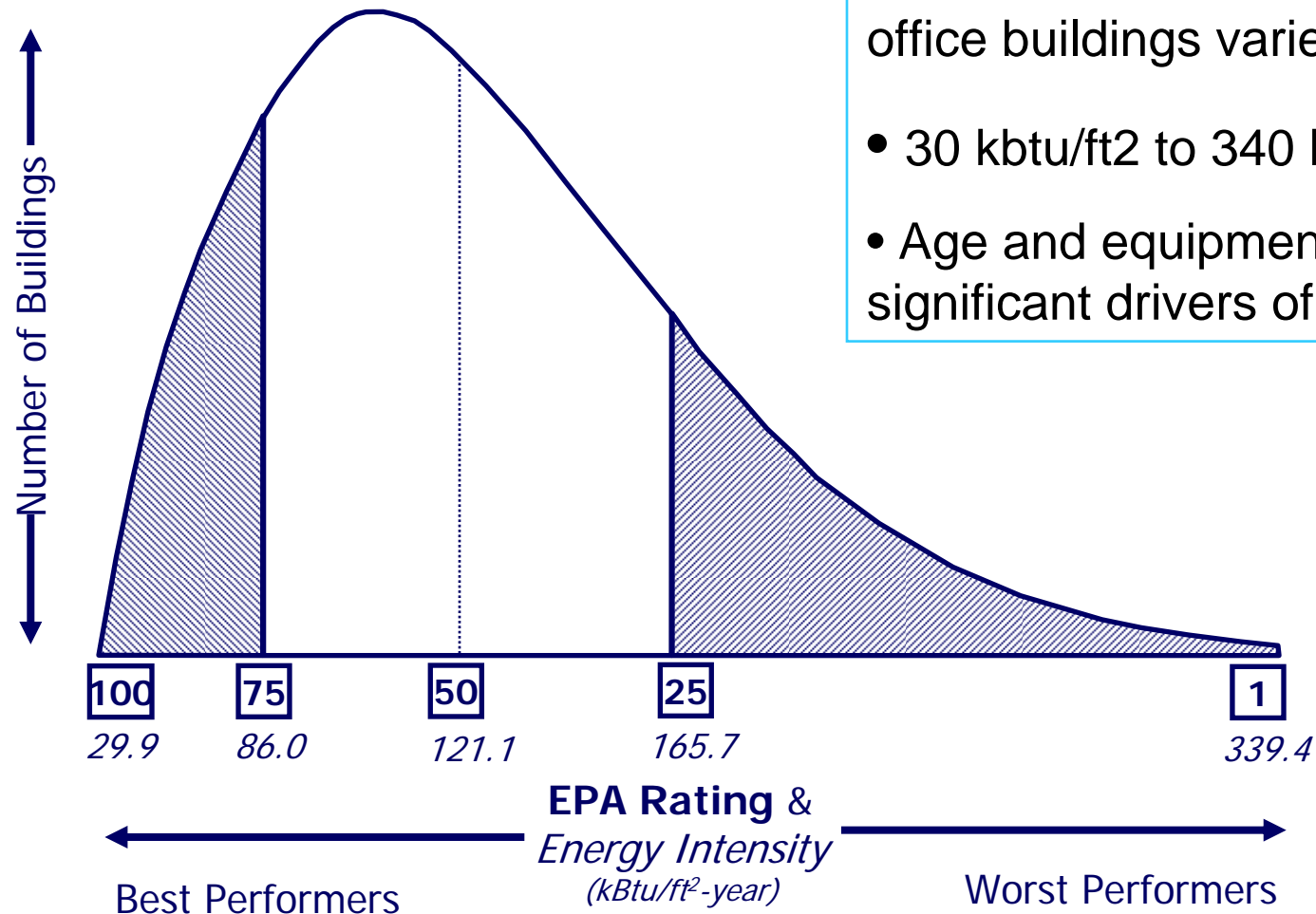
## Commercial Industry Branch



### ■ Goals

- ◆ Help businesses protect the environment through superior energy efficiency
- ◆ Motivate organizations to develop a strategic approach to energy management
- ◆ Convey information about energy performance in a simple metric that can be understood by all levels of the organization

# Energy Performance Gap



- Normalized EUI for existing office buildings varies widely
- 30 kbtu/ft<sup>2</sup> to 340 kBtu/ft<sup>2</sup>
- Age and equipment not significant drivers of EUI

# Energy Performance Gap

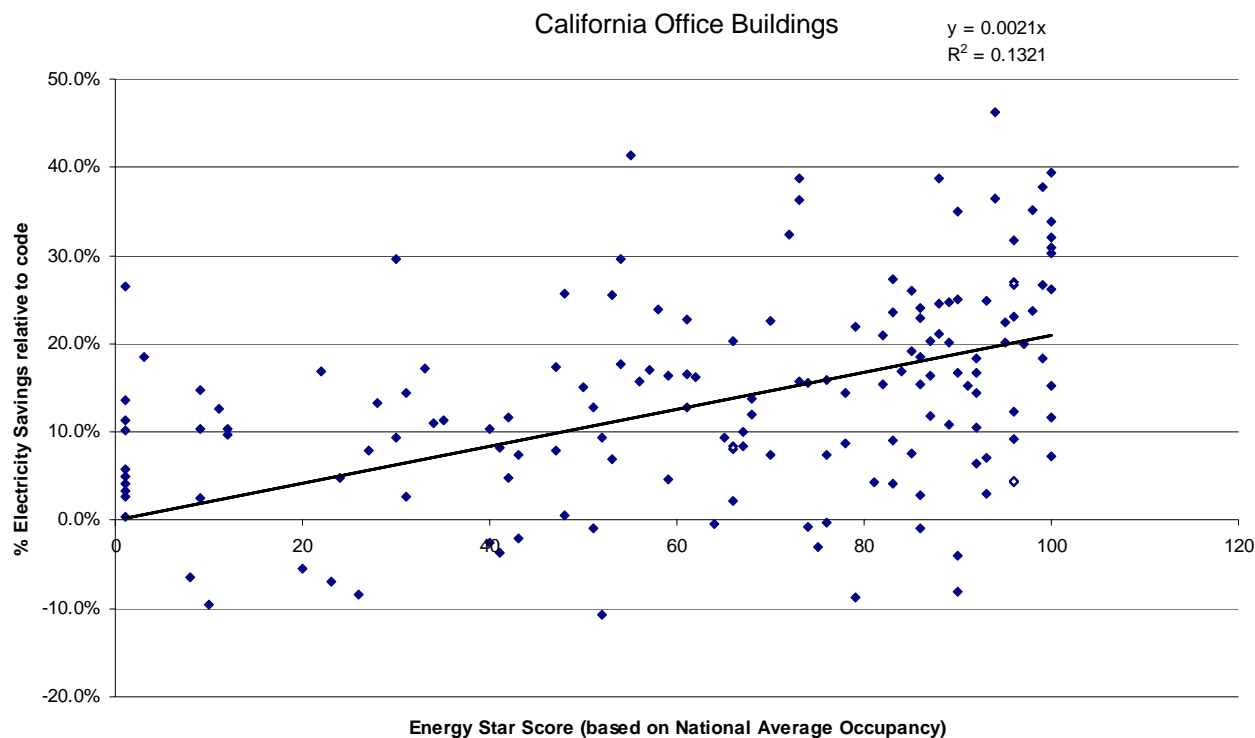


- Technology  $\neq$  Performance
  - ◆ 60% of building fan systems oversized by 60% on average (EPA fan study)
  - ◆ Chillers oversized 50% to 200% (Lawrence Berkeley National Laboratory)
  - ◆ Improper installation, sizing and poor maintenance

# Weak Correlation Between “Design to Exceed Code” and Actual Performance



## Weak Correlation: Code vs. Simulated EUI



Buildings 20% better than code can have an energy performance score ranging from 1-100.

Not sending right market signal.

Source: NBI, California Board for Energy Efficiency, EPA

# Energy Performance Gap

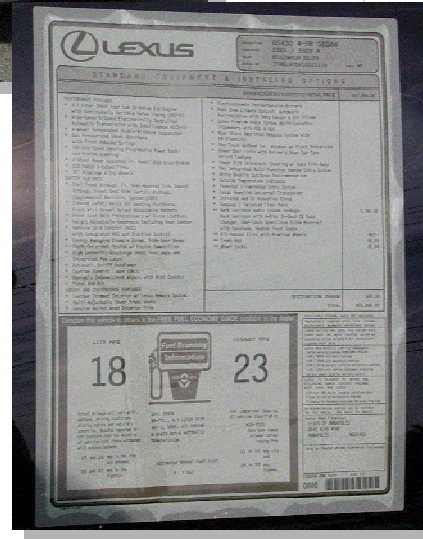


- Code not measure of performance:
  - ◆ Does not account for critical design decisions:
    - site and orientation
    - fuel choice (electric or gas)
    - HVAC system type (chiller, DX, etc)
  - ◆ Does not address system integration or result in annual building energy use estimates
    - Plug loads, elevators, refrigeration, sizing
  - ◆ Does not require buildings meet a certain “fixed” energy budget.
    - ASHRAE appendix addresses some baseline issues

# Simple Energy Metric



**Fuel Efficiency  
MPG**



**Is 10 MPG high or low for  
an automobile?**

**Is 80 kBtu/SF/YR high or low  
for a building?**

**Energy  
Performance  
EPA Rating**

**STATEMENT OF ENERGY PERFORMANCE**  
**Margrave High School**  
 Building ID: 1021120  
 For 12-month Period Ending January 31, 2004  
 Date SEP Generated: March 20, 2004

Margrave High School  
 12011 Hwy 26  
 Longwood ID 83229  
 Gross Building Area: 351,365 SF  
 Year Built: 1982

Owner:  
 Catholic Group  
 Contact: John Doe  
 1021 North Fort Meyer Drive  
 Suite 200  
 Arlington VA 22206  
 (703) 247-6900

Facility Space Use Summary	Area (SF)	Number of Students	Number of PCs	Cooling Percent
Computer Data Center	134	N/A	N/A	N/A
K-12 Schools	351,221	4,221	420	100

**Site Energy Use Summary**

Electricity (kBtu)	1,545,801	Professional Verification John Doe 1021 North Fort Meyer Drive Suite 200 Arlington VA 22206 (703) 247-6900
Propane (kBtu)	320,459	
Natural Gas (kBtu)	0	
<b>Total Energy (kBtu)</b>	<b>1,545,801</b>	License Number: 123456789 State: VA

**Ratios**

Energy Performance Rating\* (1-100): 94

Energy Intensity\*  
 Site (kBtu/SF-yr): 17  
 Source (kBtu/SF-yr): 49.4

**Emissions**  
 CO<sub>2</sub> (1000 Btu): 6,291  
 SO<sub>2</sub> (1000 Btu): 366  
 NO<sub>x</sub> (1000 Btu): 21

**Energy Cost**  
 Cost (\$/yr): \$214,685  
 Intensity (\$/SF-yr): \$0.12

**Indoor Environment Criteria\***

Indoor air pollutants controlled?	Yes
Adequate ventilation provided?	Yes
Thermal conditions met?	Yes
Adequate illumination provided?	Yes

\*Based on the results shown on this form of any test for this building, I certify that the information contained on this statement is accurate.

Notes:  
 1. Based on ENERGY STAR's Best Practices Manual for lighting quality.  
 2. Tracking Number: SEP20040300001004542



# Green and Energy Goals



## LEED-EB and Portfolio Manager

Prerequisite – Rating of 60

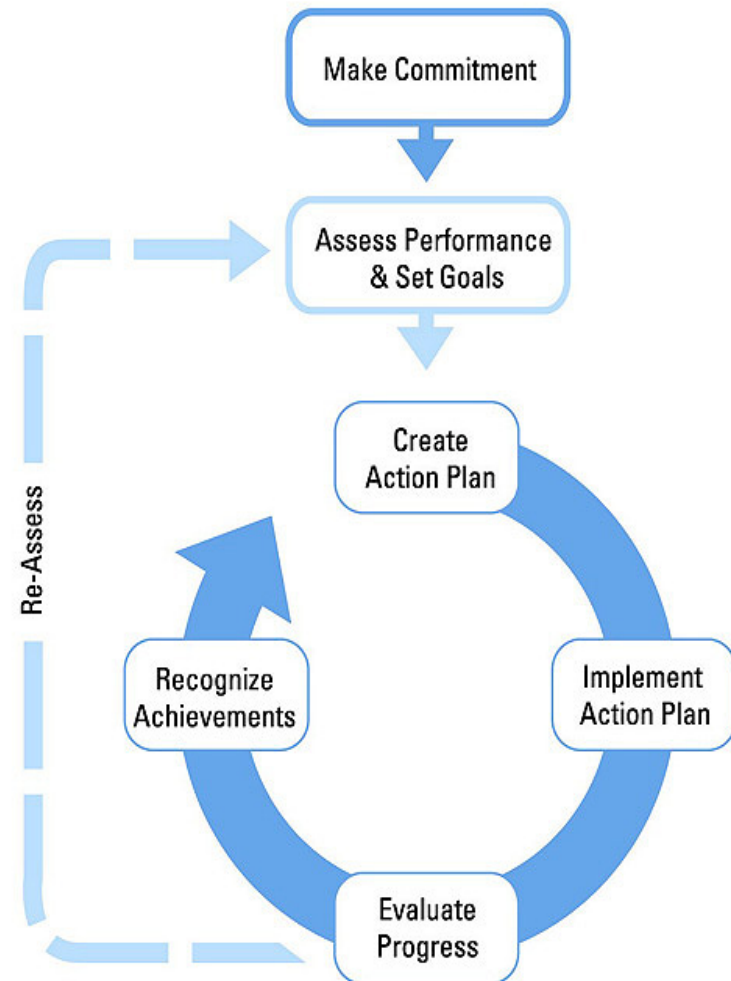
EPA Rating	LEED-EB Points	EPA Rating	LEED-EB Points
63	1	83	6
67	2	87	7
71	3	91	8
75	4	95	9
79	5	99	10



# ENERGY STAR Can Help



- ENERGY STAR's Guidelines for Energy Management:
  - Organization-wide commitment to **continuous improvement**
  - “Best practices” from top ENERGY STAR partners.



# ENERGY STAR Can Help



- **Management Tools:**
- **Establishing Organizational Commitment**
  - ✓ Partnership Letter
  - ✓ Communication resources
- **Measuring Energy Performance**
  - ✓ Objective, accessible, 3rd party rating system
- **Demonstrating Financial Value**
  - ✓ Calculators to estimate earnings/share, asset value, cost of delay
  - ✓ Analysis to confirm financial performance link
- **Recognition for Leadership**
  - ✓ ENERGY STAR Label, Awards

# ENERGY STAR Can Help



- Technical Guidance to help operators target and achieve efficiency improvements:
  - ◆ Building Upgrade Manual for existing buildings
  - ◆ New Design Guidance
  - ◆ Operations and Maintenance Reports
  - ◆ Case Studies/Registry of Energy Star qualified buildings
  - ◆ Monthly networking meeting

# ENERGY STAR Can Help



- [www.energystar.gov](http://www.energystar.gov)
- Key word "business improvement"
- Brodsky.stuart@epa.gov